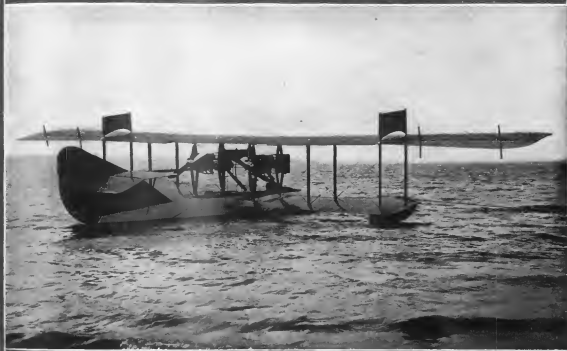


AVIATION AND AERONAUTICAL ENGINEERING



See Endowment & Underwood

The Curtiss Five-Passenger Flying Yacht

DECEMBER

1st

1916

SPECIAL FEATURES

TURNBUCKLES FOR AIRCRAFT

THE NEW NAVY DIRIGIBLE, DN-1

SCIENTIFIC RESEARCHES NEEDED ON AERONAUTIC PROBLEMS

CONSTRUCTION OF KITE BALLOONS

COURSE IN AERODYNAMICS AND AIRPLANE DESIGN

PRICE

Ten

Cents

PUBLISHED SEMI-MONTHLY

THE GARDNER, MOFFAT CO., INC.
120 W. 32nd ST. NEW YORK



Indian Motorcycle Shop and Shop on the Border

14 Indians for the Aviation Section Signal Corps, U. S. A.

The Aviation Section of the United States Army Signal Corps has ordered, for use by the Aero Squadrons, fourteen 1917

Indian Motorcycles

No greater tribute could be paid to the Indian's supreme power, speed, endurance, reliability, and general construction excellence.

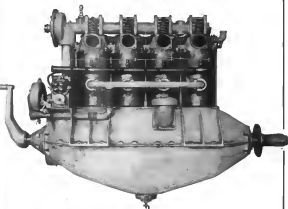
1917 Indian Catalog, illustrated and fully descriptive of Indian products, will be sent anywhere on request. It is a veritable textbook of the most advanced motorcycle construction.

HENDEE MANUFACTURING COMPANY

(Largest Motorcycle Manufacturers in the World)

SPRINGFIELD, MASSACHUSETTS

HALL-SCOTT



The Hall-Scott four cylinder, vertical, 90-100 H.P. equipment, has been especially built to meet the requirements for Army and Navy training and light scouting airplanes. The simplicity and sturdy construction of the engine, together with assurance of smooth and steady power output particularly adapts it for the use intended.

This engine is offered, after undergoing the regular series of running tests at the Hall-Scott Plant and satisfactory tests in airplanes under actual flying conditions.

Type A-7 : 90 H.P.

Type A-7a : 100 H.P.

HALL-SCOTT MOTOR CAR CO., Inc.

General offices:---818 Crocker Bldg., San Francisco, Calif.
Eastern representative: F. P. Whitaker, 165 Broadway, N. Y.

Fifty Years of Progress



THE facilities of the B. F. Sturtevant Company for the design and manufacture of mechanical products are the result of fifty years of progressive expansion. The continual development of new lines and new application.

Sturtevant



TO the American Aeronautical Industry, it brings unsurpassed plant equipment and an organization headed by experts and capable of producing superior airplanes and engines.

Sturtevant

WRIGHT-MARTIN AIRCRAFT CORP.

Owns all the Stock of

The Wright Company
Glenn L. Martin Company
Simplex Automobile Company
Wright Flying Field, Inc.
General Aeronautic Company of America, Inc.
(Export Company)

Location of Plants

Western aeroplane factory
Los Angeles, Cal.
Eastern aeroplane factory
Site now being selected near New York
Experimental aeroplane factory
Dayton, O.
Aviation motor factory
New Brunswick, N. J. (Simplex Works)
Western flying field
Los Angeles, Cal.
Eastern flying field
Hempstead Plains, L. I.
Hydroaeroplane station
Port Washington, L. I.
Total men employed, 2362

Capital Stock

7% cumulative convertible preferred, \$5,000,000
Common stock, of no par value, 500,000 shares

Officers

Edward M. Hagar, President
Glenn L. Martin, Vice-President
C. S. Jennison, Vice-President
James G. Dudley, Secretary & Treasurer
Gordon Wilson, Comptroller
A. H. Hudson, General Purchasing Agent

Counsel

Chadbourne & Shores, General Counsel
Fish, Richardson, Herrick & Neave, Patent Counsel

Directors

Frederick B. Adams
Of *Putnam, Choate & Prentiss*
Frederic W. Allen
Of *Lee, Higginson & Company*
John F. Alvord,
President, *Hendee Manufacturing Company*
T. L. Chadbourne, Jr.
Of *Chadbourne & Shores*
Harvey D. Gibson
Vice-President, *Liberty National Bank*
Robert Glendinning
Of *Robert Glendinning & Company, Philadelphia*
David M. Goodrich
Director, *B. F. Goodrich Co.*
Edward M. Hagar
President, *Wright-Martin Aircraft Corporation*
C. S. Jennison
Henry Lockhart, Jr.
Goodrich-Lockhart Company
N. Bruce MacKevie
Of *Hayden, Stone & Company*
T. Frank Maxville
President, *H. W. John-Maxville Company*
Glenn L. Martin
Vice-President, *Wright-Martin Aircraft Corporation*
S. F. Pryor
Vice-President, *Remington Arms-Union Metallic Cartridge Company*
W. Hinckle Smith
Of *Philadelphia*
Henry R. Surphen
Vice-President, *Submersible Boat Corporation*
Harry Payne Whitney

Offices

Main Office, 60 Broadway, New York City
Western Office, 937 S. Los Angeles St., Los Angeles, Cal.
Foreign Office, 35 bis Rue d'Anjou, Paris

60 BROADWAY, NEW YORK CITY

THE NEW WATER SPORT OF THE SUPERMAN

Instruction
in a General Aeroplane Co's Verville Type
Flying Boat will  convert the ardent
speed motor boat enthusiast to the
virile man making sport of flying

"PREPAREDNESS"



Office ~
150 West Jefferson Ave

GENERAL AEROPLANE CO.
Detroit U.S.A.

Hangars
Old Detroit Motor Boat Site

276

AVIATION

December 1, 1934

AVIATION

277



LAMINATED WOOD FUSELAGE

Aeroplanes and Hydroaeroplanes

ANNOUNCING OUR NEW FACTORY

60,000 FEET ON ONE FLOOR
60,000 FEET UNDER ONE ROOF

LAND AND WATER TESTING AND FLYING AT
DOOR OF FACTORY

L-W-F ENGINEERING COMPANY

FACTORY:
College Point, Long Island
Phone—Flushing 3700

Demonstrations
by
Appointment

NEW YORK CITY OFFICE:
3032 Grand Central Terminal Building
Phone—Murray Hill 6974

THE CONNECTICUT AIRCRAFT COMPANY

NEW HAVEN

CONN.

U. S. A.

CONTRACTORS TO THE UNITED STATES ARMY and NAVY

MANUFACTURERS OF

Dirigibles Non-Rigid, Semi-Rigid
and Rigid (Zeppelin) Types

Observation Balloons

Kite Balloons

Sport Type Dirigibles

Spherical Balloons of All Sizes

SPECIFICATIONS AND QUOTATIONS
ON REQUESTFACTORY and
EXECUTIVE OFFICES
NEW HAVEN, CONN.New York Office
303 FIFTH AVENUE

DECEMBER 1, 1916

AVIATION

AND
AERONAUTICAL ENGINEERING

VOL. I. NO. 9

INDEX TO CONTENTS

	PAGE		PAGE
Old and New Types of Airplanes	280	Course in Aerodynamics and Airplane Design	291
Editorials	281	Book Reviews	293
Turbocycles for Aircraft	282	News of the Fortnight	294
The New Navy Dirigible, DN-1	286	Man Law Made Records in Chicago-New York Flight	294
Scientific Research Needed for Solution of Aeronautic Problems	287	The Navy Wants Scaphow Speed Scout	294
The Austrian D. F. W. Biplane	288	Squadron Flight from Minota to Princeton	294
Aeronautical Patents	288	Bids for Army Hydroaeroplanes	295
Construction of Kite Balloons	289	Harvard Undergraduate Aero Training Fund	296
		It is Reported That—	300

THE GARDNER, MOFFAT COMPANY, Inc., Publishers
120 WEST 32d STREET NEW YORKSUBSCRIPTION PRICE, ONE DOLLAR PER YEAR. SINGLE
COPIES TEN CENTS. CANADA AND FOREIGN, ONE DOLLAR
AND A HALF A YEAR. COPYRIGHT, 1916, BY THE GARDNER,
MOFFAT COMPANY, INC.MAILED ON THE FIRST AND FIFTEENTH OF EACH MONTH
FURNISH CLOSE FIVE DAYS PREVIOUSLY. ENTERED AS SECOND-
CLASS MATTER, AUGUST 5, 1914, AT THE POST OFFICE AT NEW
YORK, N. Y., UNDER ACT OF MARCH 3, 1879.

THE CREAGH-OSBORNE AIR COMPASS

— 15 —

ACCURATE—

It indicates the North accurately.

RELIABLE—

Its accuracy is maintained whenever and wherever used.

SUBSTANTIAL—

It remains both accurate and reliable even under severest
usage during any cross-country flight.*Dial visible by Day and Night*

THE SPERRY GYROSCOPE COMPANY

Manhattan Bridge Plaza

Telephone 9700 Main

Brooklyn, N. Y.

Rue Boissier d'Anglais—18
Cite du Marais, Paris15 Victoria Street
London, E. W.

Old and New Types of Airplanes



Old Curtiss and Underwood.

The machine in which Miss Ruth Bancroft flew under the Chicago to New York trip is an old type Curtiss pusher specially built for Miss Lou's flying exhibition. The spread is 25 feet, and it carried only 55 gallons of gasoline.



Old German type.

Captured German airplane, probably of the DFW type, with engine, hood and cockpit removed. The engine is a characteristic German six-cylinder type, installed with a view to extreme accessibility. Notice of note are the exhaust gas collector in middle, with pipe to defrost glass over top plane; German type radiator; gravity feed tank behind radiator; propeller with narrow tips. The hole in the body forward is for ventilation to the engine compartment, with a door in the side to let the air out, is also interesting, as showing standard German practice.

FORUM AND ENGINE
LETTER TO THE EDITOR

MANAGING EDITOR
WILLIAM J. ROOSEVELT

AVIATION AND AERONAUTICAL ENGINEERING

TECHNICAL EDITOR
A. KLEINER, A.C.E., Editor, A.E.E.
Associate in Aeronautical
Mechanics, University of California
MANAGING EDITOR
HENRY M. WILLIAMS, A.S.

December 1, 1916

No. 9

THE first naval dirigible balloon has been shipped to Pensacola. The Bureau of Standards, the National Advisory Committee for Aeronautics and the Naval Consulting Board are all enlisted in an effort to solve some of the engineering problems connected with construction of large rigid types of dirigibles. Of course the Navy, too, it is understood, have not been idle in working at the "super-dirigible" balloon problem. Another problem that is receiving the Navy's serious attention, is the development of a satisfactory seaplane tender. If the proper dirigible and seaplane can be found the Navy will be fairly well equipped as far as an air force is concerned.

Confusion as to the function of the Naval air service appears to have arisen in many lay minds through a misunderstanding of the broad function which the Navy has in the system of National defense.

The Navy's business is to bring superior force or victory against any enemy fleet with a view to the capture or destruction of that fleet. With problems of coast defense it is practically not concerned, and commercial work are of only secondary importance.

In the event of future war, orders would probably be sent to the American battle fleet commander to capture or destroy the enemy fleet. The usual level for problems would probably go up from every harbor, seaport and coastal city, but the duty of the Navy's ground forces would be to see that no ship of any size which might add to the strength of the battle fleet should be withdrawn from that fleet.

A trans-Atlantic enemy might reasonably be supposed to adopt a campaign along lines of commercial raiding in the North Atlantic coupled with a main blow at Guantanamo and the Panama Canal, or a blow at Guantanamo and the Canal and a real blow at our Atlantic seaboard.

The disposition of the enemy fleet would have to be viewed to a certainty with the utmost possible precision while the enemy was still 2000 miles away. The torpedo boat destroyer screen could tell the fleet commander when, later on, but giant dirigibles capable of conducting reconnaissance 2500 miles from any base would serve to divulge the enemy's plans. At the present time, it seems impossible to conceive that heavier than air machines can be built with such a radius of action for one year's use.

Upon discovery of the main enemy fleet powerful wireless equipment might be used to inform the commander in chief of the enemy fleet's distribution and movements. Some of their bulky size, dirigibles, while indispensable, are not dependable in very high winds. The modern

heavy-than-air machine will soon be developed to a point where it can seem almost any hurricane. Therefore it is imperative that the battle fleet be accompanied by almost numberless little seaplane speed scouts for interference with enemy dirigibles and for fighting enemy aircraft.

These machines could attack dirigibles like kangaroos attack hawks with excellent chances of success, and they being ever present with the battle fleet aboard a tender could render a great service by giving immediate information of an invaluable character in regard to enemy tactics after battle was joined. Specially would they be necessary in weather when dirigibles were incapable of effective operation.

It is a safe premise that no enemy will attempt to land on our shores as long as we have a fleet in being. The function that the Aviation Branch of the Navy Department is considering is how to increase the efficiency of our battle battle fleet. If that fleet should be defeated any war in which we might become engaged would practically be ended so far as the Navy Department was concerned. Then it would be the Army's turn, for all our coast defense fortifications are under the War Department's control. It is the War Department's duty to prevent a landing on our shores and the bombardment of our seaport towns and it is for this purpose that the Army is about to buy a large number of twin-motored seaplanes.

Miss Lou's Remarkable Accomplishment

In a little exhibition airplane modeled after those of three and four years ago Ruth Bancroft Law has established a new American one-stop distance record of 240 miles. Her flight is a great personal achievement. In a machine of antiquated type, without elaborate navigating accessories and lacking experience in cross-country flying, she has established a new American cross-country distance record. It is an achievement of which any one might well be proud.

Victor Carlstrom, whose record she broke had a sportsmanlike tribute to her when he said: "Her flight is the best performance to date in American aviation, and might few Redwings there have bettered it. Miss Law has shown on all the way and set the mark at which I for one will be glad to shoot."

To Miss Law, AVIATION AND AERONAUTICAL ENGINEERING extends most sincere congratulations. With rare skill pluck and daring she has inspired the public with a remarkable feat, that is bound to stand out as one of the brilliant achievements in aeronautical progress.

slow, entirely or partly at least. This would enable every flyer to get back to his own base after having been fired upon.

(c) **Development of a Fabric as Good as, or better than, Jute.** Jute, for the covering of balloons, has not yet been manufactured in this country in a fabric suitable for use in covering balloons. The fabric should possess all the requirements laid down under Transparent Wing Covering, and, in addition, such as to stretch the proper amount without harm when elastic action is applied. It is possible that long fiber cotton might be developed that would answer the purpose. We want someone independent in all lines offering an military aviation. Today we depend entirely upon England and England for our linen, and the supply is becoming very low in the country.

(d) **Aviator's Clothing.** Much is still to be done in devising non-inflammable and protective clothing for aviators. This question is intimately connected with personal armor and safety in case of fall.

(e) **Altimeter-Speed Indicator.** An instrument which would measure the actual speed of an aircraft over the ground would be useful in the operation of military machines.

IV. PROBLEMS OF THE AIR

(a) **High Frequency.** At present we have no evidence of vibrations in the air much greater than 40,000 to 50,000 cycles per second, but there is no reason to deny the possibility, nor indeed the probability, of vibrations of 100,000 to 1,000,000 or even a million cycles per second in the ordinary air we breathe. If these vibrations exist, and it is a wonder if they do not, may not they have an important function to perform in nature? The nature of sound, we do not perceive there is because they are above the upper limit of the human ear, and also do not directly affect any of our other senses. A distinguished physicist, Dr. Helmholtz, stated "through all the time experienced, man has dreamed a 'detecter'." At present the detector for high-frequency air vibrations in the instruments frame, and it would be of great importance to create a detector for vibrations which would indicate their presence or absence up to 100,000 or 1,000,000 per second. If we had such a 'detecter' and also means for producing such vibrations in air, it would be possible to create a system of intercommunication, over short distances at least, based upon ultra-sound waves. We need, for instance, derive a complete system as an aid to navigation.

(b) **Altimeters.** The elasticity of the air has been made to serve in a great variety of machines to perform useful work. The original discovery was of balloons utilized the elasticity of compressed air as the explosive for propelling the projectile. The best condenser for radio-telegraphically employ air as the dielectric. Any break-down automatically repairs itself and thus adds greatly to reliability. The gasometer automobile could have been made possible by the development of the gasometer tire.

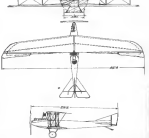
(c) **Friction.** The magnitude of the friction of the air against the surface of bodies moving through it may consume large amounts of energy. The average velocity of shooting stars is 20 miles per second. They vary from 15 to 30 miles a second. The earth's orbital velocity is about 18 miles a second. It is needless to add that enormous amounts of energy from the shooting star's velocity according to the way the body enters the atmosphere. The friction of the air at these velocities is so great as to volatilize metals. A mass of one gram of air moving with this velocity, 30 miles per second, has a kinetic energy of 9,000 to 100,000 ergs, which is sufficient to lift one ton of matter, 2,000 pounds, to a height of 200 feet above the earth's surface. One gram is a small piece of matter to possess this potentiality. This energy, we comprehend, is put at any rate, the disastrous results of the cyclone, where houses and forests are hoisted up down as if of great steel balls.

(d) **Mass.** A cubic foot of air at 6 degrees C. and 76 cm. pressure weighs .001275 pounds, according to Rayleigh. At 20 to 30 miles a second, the air is at 12, therefore, weighs 200,000 pounds. In light of this fact form this air could be removed from the tubes with difficulty by a strong man. On this view, it appears that we have been making much too much of a big thing of the air pressure, the lower limit, and that only recently have we learned

how to utilize the dynamic reaction of this fact in making machines for transportation freely in those dimensions in the interior of this mass. Who among us is wise enough to forecast what these machines may yet accomplish?

The Austrian D.E.W. Biplane

John Langlois, in a recent issue of *L'Aerophile*, gives an interesting description of a machine that was captured by the Italian forces at Anagni last April. Although it was attached to the Austro-Hungarian army and went under the name of Lohrer, it is unquestionably a D.E.W., either of German construction or built from the German design. This is



picture shows a departure from the type which gave the D.E.W. the nickname of the "Beehive" and which was illustrated in the August 1 issue of *Aviation*.

The striking effect of the upper wing is not straight, the leading edge being shaped back so that the chord steadily decreases towards the rear. The lower wing, however, has a typical swept-back form. The upper wing is hinged to the fuselage by a pair of struts sloping slightly outward, instead of being rigidly on a parallel chord, as was formerly the custom.

The elevator flaps and rudder are of nearly quadrilateral shape, as in this machine, whereas in the D.H.4 type they were shaped in an irregular manner. The ailerons are also in the line to be many other French aeroplanes. The motor employed is a Werksporen, or Austrian make, and the motor of the fuselage vertical type. The above are some details of the design are shown in the drawings reproduced here.

Aeronautical Patents

Claims of these patents may be obtained for free, under each, by addressing the Commissioner of Patents, Washington, D. C.

ISSUED NOVEMBER 7, 1914.

1,898,938. Filed Jan. 16, 1914. To Raytheon Trust, Inc., Providence, R.I. (By Arthur H. Shaw, Jr., Attorney at Law, Providence, R.I.)

1,898,939. Filed Jan. 16, 1914.

1,898,940. Filed Jan. 16, 1914. To Charles Leonard Shaw, A. C. Shaw and C. O. Shaw, Baltimore Park, England. A flying wheel or

Construction of Kite Balloons

By R. H. Upson

Types of military apparatus which are considered necessary today may be in the scrap heap tomorrow, and yet by a simple reversal of conditions the obsolete, the forgotten, often even back to play upon the part of a new generation. There have been many instances of this during the present war. Many of the great inventions of the 19th century, (even those from the 16th Century) War, and had to stand fighting for the century. Groche and Henson.

The kite balloon, now in general use in the European armies, is merely a combination of two principles, one nearly as old

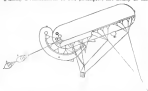


FIG. 1. WEHRHAKES KITE BALLOON IN FLIGHT.

as a kite balloon, the other discovered over a military age. Neither principle alone ever quite filled the bill. A man-riding balloon required a strong cord to fly. An ordinary captive balloon on the other hand could only be flown in a comparative calm. But in the kite balloon we have a combination that over the age of either condition.

The apparatus is essentially an elongated balloon which is always kept in an inflated position like a line. Thus the wind loads it up by blowing against the under side. This counter acts the tendency tendency of a wind to blow the balloon over toward the ground. Kite balloons are now designed on com-



FIG. 2. THE ORIGINAL GOODYEAR MODEL.

tail or nearly all modern warfare on land and sea. They are superior to the old fashioned captive balloons, and even the balloon is all aimed to perform the kite balloon's particular function at range finding and general observation of the horizon. Understanding its great superiority over the old-fashioned balloons, the kite balloon has been designed in a number of styles. Even a few kinds with tail caps, the use of balloons was difficult, and severe shortcomings were as not to be considered with. The highest wind in which good observation could be made, 25 miles per hour. The kite balloon was also rather high. The entire balloon over

by a considerable mass, seriously limited the altitude attainable, and at the same time put a disproportionate strain on the cable.

Fig. 1 shows the standard Wehrhake type of kite balloon. Its construction depends on the combined action of the "steering bag," a, and the "tail caps," b-b. Its resistance may be considered as made up of several parts:



FIG. 3. THE GOODYEAR KITE BALLOON (CAPACITY 25,000 CUBIC FEET).

1. The resistance of the goading shaft, a function of its size and shape.
2. The resistance of the steering bag, greatly augmented by the large opening at its front.
3. The pull of the tail caps, determined by the number of them necessary to maintain a reasonable steadiness.



FIG. 4. KAEL ON THE GOODYEAR KITE BALLOON.

4. The resistance of the carriage and basket.
 5. The resistance of the anchorage cable.
- Fig. 2 shows the original model, made by the Goodyear Tire & Rubber Co., which was probably the first produced in this country. Had it been the first it would have been the standard by increasing the efficient lateral surface of the

Harvard Undergraduate Army Training Fund

The report of the Harvard Undergraduate Army Training Fund just issued shows a record of achievement which must be very encouraging to the five hundred odd subscribers.

Of the aviators sent who were sent to the 100 miles, Wright and Thomas schools, twelve have qualified for their pilot licenses, four have not yet completed their course of forty-hour instruction on the air, and the majority was unable to attempt the flight to qualify for the license before the opening of refuge because of the weather conditions. Speaking of the success of the ten men who attended the Curtiss school out of whom qualified for his license, the report says:

Due to favorable weather conditions, to the training efforts of Lieutenant Baker, to the contribution contributions of the Harvard men, and to the adequate equipment of the Curtiss plane, only men before the end of the summer immediately passed the license test without an accident. That this was a success that the most optimistic could not have predicted will be readily realized by those who are familiar with the difficult time, delays and accidents attending aviation schools here in America.

In conclusion the report reads:

The men who completed their course are now graduates of institutions training to qualify them as expert military aviators. Several legislative bills pending before Congress for aerial reserve. Whether or not the War Department will take advantage of this legislation in such a manner as to make it possible for these Harvard men to become members of this service is still a matter of conjecture.

The need of military aviators is just as apparent now as it was last spring. The committee is convinced of the importance and value of the work accomplished, yet it is not yet prepared to say that the work should be continued as the summer session another year. Letters have been received from time to time from other universities insisting that this work should be continued and will be by its example or indirectly in favor of more widespread aviation training here in America.

The committee is now endeavoring to get cooperation from the Government. Whether or not in the opinion of the committee the work should be continued another year depends largely on the attitude of the Government in regard to the further training of the men who have already qualified as pilots.

The committee wishes to express the appreciation of the Harvard students to the officers of the greatest financial support of the Aero Club of America, graduates and alumni and of the assistance and valuable advice given by those interested in the movement. Also the committee expresses appreciation of the cooperation of the schools and instructors, and those at sea—the nearest refueling camp, residence and transportation of these undergraduates who spent their summer in the work and who are primarily responsible for the results obtained.

ROGER ANDREY, '35, Chairman,
ALAN FORBES, '35,
GORDON H. RACER, '32.

The financial statement follows:

Contributions	\$5,000.00
Aero Club of America and Boston House	\$5,000.00
Contributions from donors	\$125.00
Interest and bank balance	125.00
Total	\$10,125.00
Expenses and expenses:	
Instructional	\$1,000.00
Travel of donors	\$100.00
Books and charts	\$100.00
Cash balance	\$1,000.00
Total	\$2,200.00

Permanent Force of 20,000 British Airmen Asked

Lord Montagu of Beaulieu, speaking recently at Edinburgh, Scotland, on aircraft policy, said that when peace came the British air service must be the best to be ordered. A rapid revision might not come, but by means of an increased shipyard it might come on a scale sufficiently large, which it would send all the British aircraft forces to meet. Of 20,000 men at sea, at least 15,000 would have to be defended by air. If in the country a permanent force of 20,000 men was created, the cost would not be more than \$75,000,000.

He also said that England had wanted the position when the Air Board should be given control at least of the supply side, and there should be one trained air service for the navy. He looked forward to an imperial air service. England should not only be stronger and well served, but the air service must take front rank in protecting the empire.



Four More Advantages

of the geared type of aviation motor, which is becoming more and more recognized as the ultimate type, are well shown in the

THOMAS 135 H. P. Aeromotor

1. Ease of installation.
2. Short overall length.
3. Separate propeller shaft drives crankshaft of various gyroscopic stresses.
4. Maximum power without sacrifice of propeller efficiency.

Contractors to U. S. Army and Navy.

Thomas Aeromotor Co., Inc.
ITHACA, N. Y.



BURGESS FLYING BOAT



After conversion into the Burgess Company offers a water and air craft ideal for operations.

Safety and comfort never before attained in flying is achieved in this latest model built under the patents of Burgess, Curtiss and Dugan.

The crew is seated in a comfy, seaworthy hull, provided with wind and spray shields, deep cushioned lockers, and all the appointments of a modern high-speed launch.

Absolute inherent balance is assured by the Burgess system a balance as certain and sure as that afforded by the hull of a sailing yacht.

Steering is ensured in a single wheel with duplicate control disc pilot and passenger.

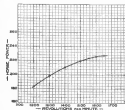
The engine may be started without leaving the cockpit.

The construction is worked out with a degree of detail which must be seen to be appreciated.

THE BURGESS COMPANY, Marblehead, Mass.

NOTICE

Owing to changes and improvements our 8" x 5" eight-cylinder motor, formerly known as Model "VX" rated at 160 horsepower, will hereafter be known as Model "VX-3" and will be rated at 200 horsepower. The following is a record of electric dynamometer test of stock motor "VX-3" No. 3512 as delivered from the Production Department.



Duration of test (minutes)	40
Average R.P.M.	1403.33
Average load on scales (lbs.)	449.54
Average horsepower	168.36
Maximum observed horsepower	180.30
Maximum observed horsepower	168.10
Total Gas consumption (lbs.)	111.30
Total Gas consumption (U. S. gals.)	18.18
Gas consumption per hour (lbs.)	111.30
Gas consumption per hour (U. S. gals.)	18.18
Gas consumption (lbs. per H. P. per hour)	5.28
Total Oil consumption (lbs.)	6.50
Total oil consumption (U. S. gals.)	8.44
Oil consumption (lbs. per H. P. per hour)	3.84
Oil pressure—start of test (lbs.)	71.00
Oil pressure—end of test (lbs.)	73.00
Oil pressure—maximum test (lbs.)	74.00
Oil pressure—minimum test (lbs.)	68.00
Average inlet water Temp. (F.)	115.00
Average outlet water Temp. (F.)	140.30

CURTISS AEROPLANE & MOTOR CORPORATION

Buffalo, N. Y.

DU PONT

The Standard Dope for Aeroplane Surfaces

DuPont Dope is used on over 90% of the machines built in this country for U. S. and foreign governments

DuPont Dope deposits a tough, flexible, and waterproof film that imparts great strength to the fabric, with correct shrinkage.

DU PONT CHEMICAL WORKS

811 de la Puente de DuPont & Co. Street

120 Broadway New York

DILLNER-MEYER MFG. CO., INC. SUCCESSOR TO A. J. MEYER CO.

Airplane Turnbuckles and Fittings of
Uniformity, Toughness and High
Resistance to Crystallization

SCREEN MACHINE PRODUCTS OF EVERY DESCRIPTION

809-821 John Street
WEST BBRIDGE, N. J.

G. A. Cavanaugh's Book on Models

George A. Cavanaugh, author of "Model Aeroplanes and Their Motors," recently issued by Moffet, Yard & Company, was born in New York City April 25, 1904. After graduating from grammar school he became interested in the study of aviation and has many other successful men in the aeronautical field, took to the construction and flying of model aeroplanes as a practical means of acquainting himself with the elementary principles of flight. During the year 1922 he wrote the world's record for Circumnavigation of Flight of models. In 1924 he held the world's distance record for models rising from the ground, and also the distance record for models rising from the surface of the water.

And from being a writer on model aeroplanes, Mr. Cavanaugh also lectured on the subject. In the interests of the Aero Engine Club of America and the Y. M. C. A. model organizations, he has delivered lectures before many student bodies, whose members have been fascinated with the subject through his efforts.



Captain James V. Hottel's automatic lateral stabilizer is installed on one of his U. S. Government's Curtiss trainer machines at Warfield, L. I. The machine under the controls Pilot-Student Adams made the flight from Mineola to Port Jervis with perfect adhesion.

Perfect Starter Tests

The following tests of the Perfect airplane engine and starter have been supplied by the manufacturers to Aviators and Aeronautical Engineers:

The starter is of the four-cylinder cranking type, made by The Motor Compressor Company, Newark, N. J., and acts automatically as an air compressor, discharging into a storage tank, and a starting engine receiving the supply of air from the storage tank. The starter was coupled directly to the crankshaft of the eight-cylinder 5.7 inch V8 motor No. 20, on one of the first stands, with storage tanks, control valve, gauges, etc., attached to the frame of the stand.

DEMONSTRATION TEST

October 10, 1936

Time 1:30 to 4:30 P.M.

Place of test: 10

Engine: 5.7 inch V8

Starter: 4-cylinder

Stand: 10

Time: 1:30 to 4:30 P.M.

Motor was started by motor and pressure from the pressure in the storage tank. Motor was stopped and started 47 times, each taking 4.15 seconds, after which time a demonstration was made of starting the motor and starting the engine on the following:

Time	Start and pressure from the storage tank	Start and pressure from the storage tank	Start and pressure from the storage tank	Start and pressure from the storage tank	Start and pressure from the storage tank
1:30	4.15	4.15	4.15	4.15	4.15
1:45	4.15	4.15	4.15	4.15	4.15
2:00	4.15	4.15	4.15	4.15	4.15
2:15	4.15	4.15	4.15	4.15	4.15
2:30	4.15	4.15	4.15	4.15	4.15
2:45	4.15	4.15	4.15	4.15	4.15
3:00	4.15	4.15	4.15	4.15	4.15
3:15	4.15	4.15	4.15	4.15	4.15
3:30	4.15	4.15	4.15	4.15	4.15
3:45	4.15	4.15	4.15	4.15	4.15
4:00	4.15	4.15	4.15	4.15	4.15
4:15	4.15	4.15	4.15	4.15	4.15
4:30	4.15	4.15	4.15	4.15	4.15

Now the motor was started by motor and pressure from the pressure in the storage tank. Motor was stopped and started 47 times, each taking 4.15 seconds, after which time a demonstration was made of starting the motor and starting the engine on the following:

A New Packard Airplane Engine

The Packard Motor Car Company is experimenting with new airplane engines. The new engine will be of the L-head variety, built at an inclined angle of 40 degrees, instead of 90 degrees, in order to reduce head resistance.

The crankshaft will be of the three-bearing variety, 18 inches in diameter. The cylinders will have overhead valves which will be operated by an improved overhead camshaft mechanism which the company has perfected during the past year. The cylinders will be made out of solid steel billets with a glaze steel jacket. The engine will be designed so that the crankshaft and starting can be supplied when desired.

Rotation gears will be provided to take propeller shafts run anywhere from 600 to 1400 revolutions per minute. The engine is having over 2100 revolutions per minute, which speed it is expected to develop more than its rated horsepower. The engine will weigh approximately 800 pounds and will develop approximately 250 horse-power.

Radium Compound No. 6

is specified in United States Government
"Aeronautical Specification No. 1002." For

Illuminating

Barometers Clocks Compasses
Speed Indicators Inclometers, etc.

WE ALSO MAKE OTHER GRADES OF RADIUM COMPOUND

Send us an instrument for specimen treatment

Radium Chemical Company

Forbes and Meyran Aves.

Pittsburgh, Pa.

CHRISTOFFERSON MOTOR CORPORATION Aeronautic Motors

CHRISTOFFERSON AIRCRAFT MFG. CO.

Military and Sporting Land and Water Aeroplanes

NEW YORK
61 Broadway

School and Factory
REDWOOD CITY, CAL.

SAN FRANCISCO
57 Post Street

WITTEMANN-LEWIS AIRCRAFT COMPANY INC.

IT IS REPORTED THAT—

Two new instructors were added recently to the staff which is being conducted in the new government aviation school at Johnson, Ill. The latest addition to the staff, which already included a number of those of note, are Victor Fawcett and A. K. Thompson, the former a graduate of the Curtiss school.

A military balloon landed near Washington Camp Hess, Pa. recently, after a trip from Akron, Ohio, a distance of about 120 miles. The balloon was piloted by C. E. Stern and C. A. Winters, of Akron, and made the trip in 3 hours and 45 minutes. Reports state that the balloon was of the dirigible type, shaped like a large cigar, but carried no engine power. It was steered by means of ropes and the trip was made for the purpose of testing the steering, elevating and lowering plans to demonstrate their availability for practical purposes.

STANLEY WILLIAMS GRIFFIN, who left the aviation field a month ago, returned to the United States, on the day of his flight to Washington, landed at Philadelphia after a trip of twenty-five minutes. The designer was 30 years, giving him an average of eight miles an hour. The purpose of the journey, was to demonstrate the stability, intended by A. J. May at Chicago. A competitor headed by John W. Wilson, remains of the President, in backing the stabilizer.

WILLIAM WOOD, of New York, who, while flying with Charles Berry, was killed at Midway, Ill., fell to his death at Governor's Island on September 3, and in November 1934 at the post hospital on Governor's Island as a result of the accident.

GEORGE P. TOWN has been placed in command of the Naval Flying Corps, attached to the United States of America. Until he received orders to return to Italy, recently, MAJOR R. PROBERT was in command.

STANLEY ELKIND, son of the late United States Senator Stanley B. Elkand, is said to have done the flying necessary for his elementary pilot's license.

ANTONIO PARRA of Cuba, who learned to fly in the United States, will soon return to Cuba, taking with him the "John Lanning Cuban" silver trophy.

JOHN HIGGINS, aviator, fell in a flight at the aviation grounds, near Hager, Md., November 4, and was killed. This was the last day of his engagement to fly for his corporation. While making a "vertical" flight with his engine stopped fell 100 feet. The machine came down after the engine stopped. Ground and engine, carrying to the spot, found his body badly crushed. Higgs, known as the "Big Boy" Higgs, on account of his size and performance, was born at Newmarket, Penn., thirty-two years ago. He has a widow, and two children.

THE E. B. BARNETT AERIAL VEHICLE COMPANY announces that, despite the considerable financial loss incurred through a recent fire in its plant, it has already moved into new quarters at 2645-56 Broadway, Chicago, Ill. The company intimates that it will soon be able to announce new surprising developments.

ALEXANDER BARNES, sportsman cricket player, polo player and aviator, was killed when he fell with his airplane into the Delaware River at Easton, before Philadelphia, on October 24. The flight was to have been the last for his license.

FRANK DE WITT of Washington, D. C., is also leaving to fly at Norfolk. He is said to be ready to fly now at the low time there being an open spot.

GEORGE FRANKS of Beverly Farms and Boston, a brother of Norman Franks recently killed in flying on the front in France, is making rapid progress in flying at the Naval School at Washington. On October 25, he flew more than four flights with nearly one hour altogether in the air, and with especially rough air under his hands.

GEORGE C. TITMAN, a well known Philadelphia, has taken elementary flying. He is said to be at the aviation school at Kensington, Pa.

Aircraft Manufacturers

Standard and Special Designs

Ocean Terrace and Little Cove Road
STATEN ISLAND
NEW YORK CITY
Tel. West Brighton 1029

FOXBORO

AIR SPEED INDICATOR

Forewarns and Prevents Stalling

Justly called the "best" indicator in the world.

Look and compare!

Send for Bulletin No. 311



THE FOXBORO CO., Inc.
FOXBORO, MASS., U. S. A.

New York Chicago San Francisco

A Standard Dope of Proven Quality NAIAD AERO VARNISH WATERPROOF—AIRTIGHT

Prevents Chalking in Cloth
Tension with the Atmosphere

Send for free sample now for:

AVIATION DEPT.

THE C. E. CONOVER CO.

221 Franklin St. New York City

Fahrig Anti-Friction Metal

The Best Bearing Metal on the Market
A Necessity for Aeroplane Service



Fahrig Metal Quality has become a standard for reliability. We specialize in this one-copper alloy which has superior anti-friction qualities and great durability and is always uniform.

When you see a speed or distance record broken by Aeroplanes, Racing Automobiles, Trucks or Tractor Motors, you will find that Fahrig Metal Bearings were in that motor.

FAHRIG METAL CO., 34 Commerce St., N. Y.

Aeroplane Linen

Used by the BRITISH GOVERNMENT in their Air Service; also by the UNITED STATES GOVERNMENT and Large Aeroplane Manufacturers

Large stocks on hand
Samples and specifications sent on application

Robert McBratney & Company

Linen Manufacturers & Importers
121-123 Franklin Street, New York

Factors of Safety

These Count in Aeroplane Construction

NON-INFLAMMABLE

Cellulose Acetate Base

Celestron Cloth Varnishes

provide another SAFETY FACTOR

NON-INFLAMMABLE

Celestron Sheets AND Films

Transparent — "Waterproof"

MANUFACTURED BY

Chemical Products Company

93 Broad Street Boston, U. S. A.

Manufacturers of Cellulose Acetate for nearly 15 years

For Effective Illumination of Instruments for Night Flying

TREAT YOUR

Compasses

Altimeters

Staloscopes

Climometers



SEES AT NIGHT

Anaeroids

Oil Gauges

Ammeters

Manometers

Clocks

with the only genuine self-luminous compound showing high luminosity at reasonable prices

We will illustrate one of your own instruments without charge if you will send it to us.

RADIUM LUMINOUS MATERIAL CORPORATION
68 LIBERTY STREET, NEW YORK

Send for material used on request

COUNTERBALANCED



STANDARD

AEROPLANES AND HYDROAEROPLANES

CHAS. H. DAY, *Designer*



THE STANDARD MODEL H3 TRACTOR

Army and Navy orders now being filled as the
result of official inspection of factory and products

STANDARD TRACTOR BIPLANES

STANDARD HYDROAEROPLANES

Single and Twin Motored Types offered
on the basis of results and not expectations

STANDARD AERO CORPORATION

OF NEW YORK

EXECUTIVE OFFICES
Woolworth Building, New York

FACTORY
Plainfield, New Jersey